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Original article

Long-Term Improvements in Knowledge and Psychosocial Factors of a Teen Pregnancy Prevention Intervention Implemented in Group Homes

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A B S T R A C T

Purpose: Youth in out-of-home care have higher rates of sexual risk behaviors and pregnancy than youth nationally. This study aimed to determine if Power Through Choices (PTC), a teen pregnancy prevention program developed for youth in out-of-home care, significantly improves knowledge and psychosocial outcomes regarding HIV and sexually transmitted infections (STIs), sexual activity and contraception methods, long term.

Methods: A cluster randomized controlled trial was conducted with 1,036 ethnically diverse youths (aged 13–18 years) recruited from 44 residential group homes in three states. Intervention participants received the 10-session PTC intervention; control participants received usual care. Participants were administered self-report surveys at baseline, after intervention, 6 and 12 months after the intervention. Survey items assessed knowledge, attitudes, self-efficacy, and behavioral intentions regarding HIV and STIs, sexual activity and contraception methods. Random intercept logistic regression analyses were used to assess differences between the intervention and control groups.

Results: Compared with youth in the control group, youth in the PTC intervention demonstrated significant improvements in knowledge about anatomy and fertility (adjusted odds ratio [AOR] = 1.07, 95% confidence interval [CI] = 1.03–1.11), HIV and STIs (AOR = 1.03, 95% CI = 1.002–1.07), and methods of protection (AOR = 1.06, 95% CI = 1.03–1.09), as well as self-efficacy regarding self-efficacy to communicate with a partner (AOR = 1.14, 95% CI = 1.04–1.26), plan for protected sex and avoid unprotected sex (AOR = 1.16, 95% CI = 1.04–1.28), and where to get methods of birth control (AOR = 1.13, 95% CI = 1.01–1.26) 12 months after the intervention.

Conclusions: Findings suggest that the PTC intervention can have positive long-term knowledge and psychosocial effects regarding contraception methods on youth in out-of-home care.

IMPLICATIONS AND CONTRIBUTION

The long-term impact of pregnancy prevention interventions for youth in out-of-home care is not well understood. This large-scale cluster randomized control study found that the Power Through Choices intervention had positive sustained effects on knowledge, attitudes, self-efficacy, and intentions to use birth control in a high-risk population.

Relative to youth in the general population, youth in out-of-home care are at increased risk for pregnancy due to engagement in risky behaviors including early sexual initiation, current sexual activity, having sex with multiple partners, and lack of

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consistent condom and contraception use [1–3]. Thus, it is not surprising that research consistently indicates that pregnancy and birth rates among youth in out-of-home care are higher than rates among youth nationally [4–7]. Youth residing in out-of-home care are 2.5 times more likely to become pregnant by the age of 19 years and more than 1.5 times more likely to experience a repeat pregnancy than their counterparts in the general population [5,6]. Despite an increased risk for pregnancy and sexually transmitted infections (STIs) and unique social, behavioral, and economic challenges, youth in out-of-home care often do not receive adequate sexual health education due to myriad issues such as programming implemented with little fidelity, financial limitations, lack of collaboration between child welfare professionals and practitioners, and difficulties with guardian consent and confidentiality issues [8–11].

There is strong evidence to support the conclusion that teen pregnancy prevention (TPP) interventions can influence sexual and contraceptive behaviors among youth nationally although theoretical constructs that underlie changes in behaviorless are less understood [12,13]. Constructs from behavior change theories, such as the health belief model, theory of planned behavior, and social cognitive theory, have been used to develop evidence-based TPP programs [14–18]. These theories posit that changes in intermediary psychosocial constructs such as self-efficacy (e.g., youth with high self-efficacy to use condoms may report that they feel confident that they can use condoms correctly), attitudes, and positive behavioral intentions will result in behavioral changes [14–18]. Meta-analyses demonstrate that greater knowledge of HIV/AIDS, self-efficacy, condom use intentions, and more positive attitudes positively influence sexual and contraceptive behavior [19,20].

There is evidence to suggest that TPP interventions implemented with youth in out-of-home care settings can increase knowledge regarding pregnancy and HIV and STI prevention, attitudes toward condoms, and behavioral intentions to use condoms [21–24]. However, these studies have been limited by short-term immediate postintervention analysis and small sample sizes. One exception is a randomized controlled trial (RCT) that assessed whether behavioral interventions implemented with adolescents (N = 218) in residential centers (N = 15) could have long-term benefits on knowledge, attitudes, and intentions [23]. The study found that youth randomly assigned to a discussion-based intervention group demonstrated significant improvements in knowledge about AIDS and intentions to reduce their risk of HIV infection 9–12 months after the intervention, relative to youth in a control group. However, there was no intervention effect on attitudes toward condoms [23].

The purpose of this study was to determine the effectiveness of the Power Through Choices (PTC) program. PTC is a comprehensive, age-appropriate, and medically accurate sexual TPP intervention for youth living in group home care and other out-of-home settings. The previous analysis assessed the short-term effects of the PTC program on knowledge and psychosocial factors [25]. Immediately, postintervention results indicated that the PTC program positively affected knowledge of anatomy and fertility, HIV and STIs, and methods of protection; attitudes supporting methods of protection; self-efficacy regarding the ability to communicate with a partner and plan for protected sex and avoid unprotected sex; and behavioral intentions to avoid sex and use contraception The purpose of this study is to determine whether these knowledge and psychosocial effects extend to 6- and 12-month follow-up.

Methods

Study design overview

The study design was a cluster RCT involving 1,036 youths recruited from 44 residential group homes in three states: California, Maryland, and Oklahoma. Group homes in each state were randomized to a treatment condition that received the PTC intervention or to a usual care control condition (i.e., did not receive any sexuality health education programming but some homes may have received other programming such as nutrition education). Identical surveys were administered in both the groups before the intervention, immediately after the intervention, and at 6 and 12 months after the intervention. The study was reviewed and approved by the Institutional Review Board at the University of Oklahoma Health Sciences Center.

Random assignment procedures

Randomization took place at the group home level. The study was designed as a cluster RCT that assigned all the youth living in the same group home to the same research condition to avoid contamination effects. Group homes were stratified and clustered according to the state (California, Maryland, or Oklahoma), recruitment date, number of youths served (group home size), and gender of youths served. Group home participation proceeded only after consent and assent was obtained for 80% of youths in the group home or for a minimum of six youths. Group homes were recruited and randomly assigned on a rolling basis to allow for the possibility of randomly assigning the same group home more than once after the entire population of youth fully turned over. Twenty group homes were randomized once, 13 homes were randomized twice, nine homes were randomized three times, and two homes were randomized four times. The first four group homes recruited in California were randomly assigned as a stratum of four clusters. All other clusters were grouped into matched pairs of two clusters for random assignment. A sample of 80 clusters across 44 group homes was obtained. No clusters were lost to follow-up over the study period. An equal number of homes were assigned to the treatment and control groups and the randomized homes contained a nearly equal number of youths (N = 517 in the treatment group and N = 519 in the control group).

Sampling

PTC is designed and is appropriate for youth living in many types of out-of-home care settings; however, the implementation of PTC described in this study is exclusive to youth living in group homes overseen by the child welfare (foster care) and/or juvenile justice systems. A group home is considered a “congregate care residential facility operated or contracted by a state child welfare system, a state juvenile justice agency, or by a private care provider” (Oman RF, Vesely SK, Green J, et al., unpublished study, 2016).

Group homes and youths were recruited to participate from 2012 to 2014. Homes were approached to participate if they had the capacity and commitment to support the study, were willing to participate, and had youth residents between the age of 13 and 18 years; therefore, sampling was purposive rather than random. Group homes were excluded from participation if they specifically served pregnant and parenting teens (maternity homes), youthful sexual offenders, and if they provided therapeutic

services to youth with significant mental, emotional, or behavioral issues. These homes were excluded because youth with these circumstances have different needs and barriers to care that the PTC intervention is not designed to address. Group home administrators completed a memorandum of agreement to participate regardless of randomization assignment. Before randomization, consent for participation was obtained from a parent or legally authorized representative. In addition, assent was obtained from individual youth before participation in the study.

A final sample of 44 group homes were recruited across three states (19 homes in California, 10 homes in Maryland, and 15 homes in Oklahoma). The majority (61.3%) of the group homes served both child welfare and juvenile justice youth, 20.5% were contracted to serve juvenile justice youth, and 18.2% were contracted to serve child welfare youth. Nearly, 60% (N = 26) of group homes served males only, 30% (N = 14) served females only, and fewer than 10% (N = 4) were co-ed. In co-ed group homes, intervention sessions were still conducted in gender-specific groups. Most homes (N = 29) allowed residents to travel off-site for public school attendance, and 61% (N = 27) allowed for unsupervised leave contingent on approval or behavioral status. The typical group home served a mean of 10.7 youths (range 1–44 youths).

Intervention

The Family Welfare Research Group originally developed PTC in response to the lack of available rigorously evaluated programs for youth in out-of-home care. PTC is an adolescent pregnancy/HIV/STI prevention program for this high-risk and high-need population [9].

The curriculum was developed based on the health belief model, theory of planned behavior, and social cognitive theory. PTC uses interactive sessions to help youth develop and practice skills regarding decision-making, making choices that fit their goals and lifestyle, accessing local resources, and learning contraceptive and risk reduction techniques. Youth in out-of-home care experience disproportionately high rates of childhood maltreatment including physical abuse, sexual abuse, verbal abuse, and neglect [26]. A history of childhood trauma has been associated with increased risk for sexual behaviors, pregnancy, and STIs [27,28] leading to a national call for trauma-informed pregnancy prevention approaches [11]. PTC addresses trauma throughout the curriculum and includes several topics such as "youths desire for a support network, strong need for affection, and higher likelihood of being exposed to sexual abuse or violence." [9]

The Oklahoma Institute for Child Advocacy updated the PTC curriculum that was used in the study. Program revisions included adding two sessions (reproductive health and STI/HIV transmission and prevention), incorporating role-play activities, updating data and resource information, and making the curriculum more inclusive to lesbian, gay, bisexual, and transgender youths [29]. The PTC program aims to empower youth to make informed decisions about their sexual behaviors and recognize consequences of these decisions on their future goals and success.

The updated PTC curriculum was implemented from 2012 to 2014 by the Oklahoma Institute for Child Advocacy in the group homes. Two trained facilitators who had previous experience implementing TPP programming in group settings delivered 10 90-minute sessions twice a week for 5 weeks to the youth. Key topics included reproductive anatomy, STI and HIV transmission and prevention, contraceptive methods, availability of health resources, and making choices that fit your goals and lifestyle. Examples of lesson objectives include demonstrating condom use negotiation, demonstrating the steps in correct condom usage, demonstrating a basic understanding of how the various contraceptive methods function, and developing a plan to protect oneself from an unplanned pregnancy, HIV, and other STIs [29]. Interactive activities included role-playing, individual reflections, small group discussions, facilitator condom demonstrations, and games.

The PTC curriculum is focused on improving knowledge and psychosocial outcomes including knowledge of HIV/AIDS and methods of protection, awareness of available contraception resources, planning for the future, developing decision-making skills sexual activity and contraception use, providing support for healthy decision-making, and improving self-efficacy to use methods of protection. These outcomes were identified as potential mediators impacting behavioral outcomes: delayed onset of sexual activity, decreased number of partners, increased use of contraceptive methods, and an increase in correct and consistent condom use. The ultimate long-term goal of PTC is to reduce the incidence in teen pregnancy and STIs.

To maintain fidelity to the curriculum, facilitators completed initial 4-day training and annual refresher trainings. In addition, facilitators completed postsession facilitator feedback forms to record the completion of key activities in each lesson. A local data collector from each state also observed and completed an observation form for 1 of the 10 sessions each time the program was implemented.

Measures

Demographic data collected from youth respondents included age, gender, race/ethnicity, length of time in out-of-home care, and current group home status ("Do you currently live in a group home?").

Measures reported in this study include sexual behavior, knowledge, attitudes, self-efficacy, and intentions regarding sexuality, and condom and other contraceptive use (Table 1). Many items were from the Youth Risk Behavior Surveillance System or from the Prevention Minimum Evaluation Data Set [30,31].

Constructs were formed using exploratory factor analysis on a polychoric matrix using principal component analysis extraction and varimax rotation. Items with a factor loading of .4 or higher were included in the construct. Responses for items representing each attitude and self-efficacy domain were summed and divided by the total number of items to create constructs with higher values indicating a more positive attitude or stronger self-efficacy. Internal consistency of the constructs was assessed with Cronbach's alpha using polychoric correlations.

Sexual behaviors

Two items assessed if the youth had ever participated in sexual intercourse and if they had ever participated in oral sex. Both items were preceded by clear descriptions of the behaviors.

Knowledge

Youth knowledge in the areas of reproductive anatomy and fertility (four items), HIV and STIs (seven items), and methods of

Table 1
Scale information for behavior, knowledge, attitudes, self-efficacy, and behavioral intentions

Construct/score	Number of items	Sample item	Item response format	Cronbach's α	Scale response format
Behavior					
	1	Have you ever had sexual intercourse?	Yes/no	NA	Percent indicating "yes"
	1	Have you ever had oral sexual?	Yes/no	NA	Percent indicating "yes"
Knowledge					
Anatomy and fertility	4	The part of the female body where a baby grows during pregnancy	Multiple choice, true, false, or do not know	NA	Percent indicating correct responses
HIV and STIs	7	All sexually active individuals are at risk for getting HIV	True, false, or do not know	NA	Percent indicating correct responses
Methods of protection	10	Condoms are 100% effective in preventing pregnancy and STIs	True, false, or do not know	NA	Percent indicating correct responses
Attitudes					
Support for methods of protection	6	Condoms should always be used if a person of your age has sexual intercourse	Four-point scale (strongly disagree to strongly agree)	.84	Mean of six items (range 1–4)
Barriers to methods of protection	5	Condoms are a hassle to use	Four-point scale (strongly disagree to strongly agree)	.84	Mean of 5 items (range 1–4)
Self-efficacy					
Ability to communicate with a partner	3	Tell your partner your feelings about what you do and do not want to do sexually	Four-point scale (very unsure to very sure)	.83	Mean of three items (range 1–4)
Plan for protected sex and avoid unprotected sex	3	Plan ahead to have some method of protection available?	Four-point scale (very unsure to very sure)	.81	Mean of three items (range 1–4)
Where to get methods of birth control	1	Find a place in your community to obtain methods of protection from pregnancy and STIs	Four-point scale (very unsure to very sure)	NA	Range 1–4
Behavioral intentions					
Intention to have sex in the next year	1	Do you intend to have sexual intercourse in the next year?	Four-point scale (yes, definitely to no, definitely not)	NA	Range 1–4
Intention to have oral sex in the next year	1	Do you intend to have oral sex in the next year?	Four-point scale (yes, definitely to no, definitely not)	NA	Range 1–4
Intention to use a condom in the next year	1	If you have sexual intercourse in the next year, do you intend to use (or have your partner use) a condom?	Four-point scale (yes, definitely to no, definitely not)	NA	Range 1–4
Intention to use birth control in the next year	1	If you have sexual intercourse in the next year, do you intend to use (or have your partner use) any of these methods of birth control? Condoms, birth control pill, the shot, patch, ring, IUD, and implant	Four-point scale (yes, definitely to no, definitely not)	NA	Range 1–4

Modified and reprinted with permission from Oman et al. [25].
IUD = intrauterine device; NA = not applicable; STIs = sexually transmitted infections.

protection (10 items) was assessed (Table 1) [10,14,15]. The number of correct responses for the items representing each knowledge area were summed and divided by the total number of items to create a knowledge score for each domain with a higher value indicating greater knowledge.

Attitudes

The survey included 11 items that measured youth attitudes toward various methods of protection and using protection [19,21]. Two attitudes constructs were created: support for methods of protection ($\alpha = .84$) and barriers to methods of protection ($\alpha = .84$) [10].

Self-efficacy

Seven items assessed self-efficacy [19,21]. Two constructs were created: ability to communicate with your partner ($\alpha = .83$) and plan for protected sex and avoid unprotected sex ($\alpha = .81$) [10]. One single-item measure was included to assess self-efficacy regarding finding a place in the community to obtain a method of protection.

Behavioral intentions regarding sexual and contraceptive behavior

Four items assessed intentions toward sexual activity [22]. The items determined the participants' behavioral intentions regarding having sexual intercourse in the next year; having oral sex in the next year, using a condom (or have their partner use a condom) if they had sexual intercourse; and using other methods of protection, such as birth control pills, the shot (Depo-Provera), or intrauterine devices. Possible responses ranged from 1 ("no, definitely not") to 4 ("yes, definitely") with higher values indicating the most desirable response.

Analysis

Baseline characteristics between intervention and control groups were compared using the two-sample *t* test and the chi-square test. To evaluate the effectiveness of the intervention and take into account the cluster effect, random intercept logistic regression models (SAS PROC GLIMMIX) were utilized to compare the psychosocial outcomes at 6 and 12 months. The 6-month model controlled for baseline demographics (age, race/ethnicity, and gender), baseline score, and living at the group

Table 2
Baseline characteristics of Power Through Choices youth by randomization status

Measure	Total sample (%)	Treatment (%)	Control (%)	Difference	*p* value
Sample size (clusters)	1,036	517 (40)	519 (40)		
Age (mean)	16.1	16.1	16.1	.0776	.3191
Gender					
Male	78.7	78.2	78.4		.8453
Female	21.3	21.1	21.6		
Race/ethnicity					.9523
Hispanic	36.6	36.4	36.8		
White, non-Hispanic	23.6	23.2	23.9		
Black, non-Hispanic	19.5	52.0	48.0		
American Indian/Alaska Native, non-Hispanic	13.8	49.7	50.4		
Asian and Pacific Islander, non-Hispanic	5.3	5.4	5.2		
Missing	1.3	.97	1.5		
Age entering foster care (mean)	13.2	13.6	12.8	.8508	.1162
Last grade completed					.4018
8th grade or less	4.4	26.0	29.7		
9th–11th grade	67.8	69.4	66.3		
12th grade	27.8	4.7	4.1		
Ever had sexual intercourse					
Yes	88.3	88.4	88.2		.9319
No	11.7	11.6	11.8		
Ever had oral sex					.8624
Yes	80.8	81.0	80.6		
No	19.2	19.0	19.4		

Values are percentages except where noted. Analysis conducted at the individual youth level. *p* values are based on a chi-square test for all categorical data and a *t* test for all other measures.

home at 6-month follow-up. The 12-month model controlled for baseline demographics, baseline score, and living at the group home at 12-month follow-up. Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) are reported and *p* values are two sided. An intention-to-treat approach was used for all analyses [32]. Potential interactions between the psychosocial outcomes and demographic variables were assessed with an alpha of .10. There was no evidence of interaction in the regression models and therefore main effects are presented. All analyses were performed using SAS (Statistical Analysis System) version 9.4 (SAS Institute, Cary, NC) for Windows.

Results

Participants

As shown in Table 2, at baseline, a majority of the participants were male (78.7%), and the sample was racially/ethnically diverse (36.6% were Hispanics, 23.6% were non-Hispanic white, and 19.5% were non-Hispanic African-American). The mean age of the participants was 16.1 years. Just over two thirds (67.8%) of the youth were in the ninth to 11th grades. Youth entered an out-of-home care facility at a mean age of 12.3 years and lived in their current group home for a median of 3.2 months before study participation (Oman RF, Vesely SK, Green J, et al., unpublished study, 2016). There were no significant demographic differences between youth in the PTC intervention and youth in the control group at baseline (Table 2).

Knowledge and psychosocial outcomes

Data in Tables 3 and 4 show the impact of the PTC intervention on the outcomes 6 and 12 months after the PTC intervention, relative to the control group. For all three knowledge areas, a greater percentage of youth in the treatment group reported correct answers at 6- and 12-month follow-up (Tables 3 and 4). The greatest mean percentage difference in increased knowledge between the treatment and control groups was in the area of support for methods of protection at 6-month (11.8%) and 12-month (11.3%) follow-up. As shown in Table 5, youth in the intervention group had greater odds than youth in the control group of correctly answering knowledge questions regarding anatomy and fertility (AOR = 1.10, 95% CI = 1.06–1.14), HIV and STIs (AOR = 1.09, 95% CI = 1.05–1.12), and methods of protection (AOR = 1.13, 95% CI = 1.09–1.16) at 6-month follow-up. At 12-month follow-up youth in the intervention had greater odds than youth in the control group of correctly answering knowledge questions regarding anatomy and fertility (AOR = 1.07, 95% CI = 1.03–1.11), HIV and STIs (AOR = 1.03, 95% CI = 1.002–1.07), and methods of protection (AOR = 1.06, 95% CI = 1.03–1.09).

Mean attitude scores regarding support for methods of protection significantly improved from baseline to 6- and 12-month follow-up by .1 for youth in the intervention group compared with youth in the control group (Tables 3 and 4). Youth in the intervention group had higher odds of reporting positive attitudes regarding support for methods of protection compared with youth in the control group at 6-month (AOR = 1.13, 95% CI = 1.09–1.16) and 12-month (AOR = 1.09, 95% CI = 1.02–1.17) follow-up (Table 5). There was no difference between the intervention and control groups with respect to attitudes regarding barriers to methods of protection at 6- or 12-month follow-up (Tables 3–5).

Mean scores for all three self-efficacy areas significantly improved from baseline to 6- and 12-month follow-up by approximately .2 for youth in the intervention group compared with youth in the control group (Tables 3 and 4). Youth in the intervention group had higher odds of indicating greater self-efficacy to communicate with a partner (AOR = 1.19, 95% CI = 1.09–1.30), plan for protected sex and avoid unprotected sex (AOR = 1.17, 95% CI = 1.06–1.29), and where to get methods of birth control (AOR = 1.21, 95% CI = 1.10–1.34) in all three self-efficacy areas at 6-month follow-up. At 12-month follow-up,

Table 3
Youth knowledge, attitudes, self-efficacy, and behavioral intentions assessed at 6 months, by randomization status

Measure	PTC intervention (N = 40 clusters)		Control group (N = 40 clusters)		Difference[a]	*p* value
	Baseline	6-month	Baseline	6-month		
Knowledge and awareness						
Anatomy and fertility	61.6%	66.7%	60.3%	56.7%	10.0%	**<.0001**
HIV and STIs	69.1%	72.9%	67.6%	64.5%	8.4%	**<.0001**
Methods of protection	66.1%	73.7%	65.3%	61.9%	11.8%	**<.001**
Attitudes						
Support for methods of protection	3.4	3.4	3.4	3.3	0.1	**.0074**
Barriers to methods of protection	2.5	2.5	2.4	2.5	0.1	.1890
Self-efficacy						
Ability to communicate with partner	3.4	3.6	3.3	3.4	0.2	**.0002**
Plan for protected sex and avoid unprotected sex	3.0	3.4	3.0	3.2	0.2	**.0015**
Where to get birth control	3.2	3.6	3.2	3.4	0.2	**.0002**
Behavioral intentions						
Intentions to not have sexual intercourse	1.5	1.6	1.5	1.6	0.0	.9696
Intentions to not have oral sex	1.8	2.1	1.9	2.1	0.0	.8338
Condom use	3.1	3.3	3.0	3.2	0.1	.1178
Birth control use	3.0	3.2	2.9	3.0	0.2	**.0079**

Numbers are means except where noted. Values in bold indicate relationship significant at $p < .05$.
PTC = Power Through Choices; STIs = sexually transmitted infections.
[a] The difference of each measure between the treatment and control group.

youth in the intervention group had higher odds of indicating greater self-efficacy to communicate with a partner (AOR = 1.04, 95% CI = 1.04–1.26), plan for protected sex and avoid unprotected sex (AOR = 1.16, 95% CI = 1.04–1.28), and where to get methods of birth control (AOR = 1.13, 95% CI = 1.01–1.26).

Mean scores on intentions to use birth control significantly improved from baseline to 6-month follow-up by .2 for youth in the intervention group compared with youth in the control group but not at 12-month follow-up (Tables 3 and 4). At 6-month follow-up, youth in the intervention group had greater odds of reporting (AOR = 1.19, 95% CI = 1.05–1.34) more positive intentions to use birth control than youth in the control group to indicate (Table 5). There were no significant differences in intentions to abstain from sexual intercourse, oral sex, or use condoms at 6- or 12-month follow-up (Tables 3–5).

Discussion

This study found that a TPP intervention developed for high-risk youth living in out-of-home care settings can have positive, long-term effects on knowledge and psychosocial outcomes. Results indicated significant long-term program effects in regard to increases in youths' knowledge about anatomy and fertility knowledge, methods of protection, and about HIV and STIs; positive attitudes regarding support of methods of protection; and self-efficacy to communicate with a partner, plan for

Table 4
Youth knowledge, attitudes, self-efficacy, and behavioral intentions assessed at 12 months, by randomization status

Measure	PTC intervention (N = 40 clusters)		Control group (N = 40 clusters)		Difference[a]	*p*
	Baseline	12-month	Baseline	12-month		
Knowledge and awareness						
Anatomy and fertility	61.6%	65.3%	60.3%	58.2%	7.1%	**.0005**
HIV and STIs	69.1%	70.8%	67.6%	64.6%	6.2%	**.0007**
Methods of protection	66.1%	72.6%	65.3%	61.3%	11.3%	**<.0001**
Attitudes						
Support for methods of protection	3.4	3.4	3.4	3.3	0.1	**.0264**
Barriers to methods of protection	2.5	2.5	2.4	2.5	0.0	.2267
Self-efficacy						
Ability to communicate with partner	3.4	3.6	3.3	3.4	0.2	**<.0006**
Plan for protected sex and avoid unprotected sex	3.0	3.4	3.0	3.2	0.2	**.0076**
Where to get birth control	3.2	3.6	3.2	3.4	0.2	**.0022**
Behavioral intentions						
Intentions to not have sexual intercourse	1.5	1.7	1.5	1.6	0.1	.6467
Intentions to not have oral sex	1.8	2.1	1.9	2.1	0.0	.8162
Condom use	3.1	3.1	3.0	3.1	0.0	.7337
Birth control use	3.0	3.1	2.9	3.1	0.0	.2871

Numbers are means except where noted. Values in bold indicate relationship significant at $p < .05$.
PTC = Power Through Choices; STIs = sexually transmitted infections.
[a] The difference of each measure between the treatment and control group.

Table 5
Adjusted odds ratio of psychosocial outcomes at 6- and 12-month follow-up contrasting intervention youth to control youth

	6-month AOR (95% CI)	*p*	12-month AOR (95% CI)	*p*
Knowledge and awareness				
Anatomy and fertility	1.10 (1.06–1.14)	**<.0001**	1.07 (1.03–1.11)	.0001
HIV and STIs	1.09 (1.05–1.12)	**<.0001**	1.06 (1.03–1.10)	**.0001**
Methods of protection	1.13 (1.09–1.16)	**<.0001**	1.13 (1.09–1.16)	**<.0001**
Attitudes				
Support for methods of protection	1.13 (1.05–1.21)	**.0006**	1.09 (1.02–1.17)	**.0101**
Barriers to methods of protection	1.07 (.99–1.18)	.0855	1.06 (.99–1.15)	.1359
Self-efficacy				
Ability to communicate with partner (Range 1–4)	1.19 (1.09–1.30)	**.0001**	1.17 (1.07–1.29)	**.0009**
Plan for protected sex and avoid unprotected sex	1.17 (1.06–1.29)	**.0013**	1.16 (1.04–1.28)	**.0057**
Where to get birth control	1.21 (1.10–1.34)	**.0002**	1.17 (1.05–1.30)	**.0048**
Behavioral intentions				
Intentions to not have sexual intercourse	.99 (.89–1.09)	.8089	1.04 (.94–1.16)	.9398
Intentions to not have oral sex	1.05 (.92–1.19)	.4480	1.05 (.92–1.19)	.4950
Condom use	1.07 (.96–1.21)	.2220	.97 (.86–1.11)	.6894
Birth control use	1.19 (1.05–1.34)	**.0048**	1.05 (.93–1.19)	.4302

Values in bold indicate a relationship significant at $p < .05$. Six-month analysis adjusted for race, baseline age, gender, group home living status, and baseline value of the measure. Twelve-month analysis adjusted for race, baseline age, gender, group home living status, and baseline value of the measure.
AOR = adjusted odds ratio; CI = confidence interval; STIs = sexually transmitted infections.

protected sex and avoid unprotected sex, and get methods of birth control. Program effects on intention to use birth control were limited to the 6-month follow-up indicating that booster sessions may be necessary to sustain the intervention's longer term effects on psychosocial outcomes and ultimately on behavior change.

The results are consistent with past research suggesting that TPP interventions involving youth in out-of-home care settings are capable of producing long-term increases in HIV knowledge and stronger intentions to not engage in unsafe sex [23]. The findings also agree with the results of shorter term studies that indicate that TPP interventions can affect attitudes toward condoms [21–24]. Further research is needed to determine if the intervention's positive effects on knowledge and psychosocial factors, in turn, influence sexual and contraception behaviors as predicted by behavior change theories [14–18].

There were no significant improvements regarding intentions to not have sexual intercourse or oral sex in the next year. These results were not completely unexpected as a great majority of the population had already engaged in sexual intercourse (nearly 90% of youths at baseline) and oral sex (81% of youths at baseline). It may be necessary to deliver interventions at an earlier age before youth become sexually active to have an impact on sexual intentions and behaviors. In addition, there were no significant improvements regarding behavioral intentions to use condoms. The results are also not surprising as youth's attitudes regarding barriers to methods of protection were unaffected by the intervention. Attitudes and intentions toward condom use may be difficult to change and therefore improvements in contraception behavior may be driven by increases in hormonal contraception use rather than condom use.

Although statistically significant, the magnitude of change and the between-group differences for some of the outcomes present an interesting question regarding practical significance. For example, the mean difference in the self-efficacy, attitudes, and behavioral intentions areas ranged from .1 to .2 and the mean scores indicated that youth in both groups typically indicated "agree" for support for methods of protection and were "sure" in all three self-efficacy areas. Additional program activities, such as more role-play scenarios, may strengthen the effects of the intervention, increase the magnitude of change, and also increase the likelihood that improvements in knowledge and psychosocial outcomes lead to improvements in long-term behavior [33,34].

Limitations of the study include the small number of female participants which resulted in low statistical power to detect possible significant gender differences that past research suggests, exists in regard to knowledge and psychosocial factors related to sexual behavior [20,35,36]. Furthermore, although the results indicate positive long-term program effects on knowledge and psychosocial outcomes, it is unclear if these effects are associated with changes in youth's sexual and contraceptive behaviors. Mediation analysis has been used to examine if theory-based psychosocial factors mediate the effects of TPP programs on sexual behaviors and contraceptive use [14–18,35–38]. Future research could determine whether knowledge and psychosocial outcomes mediate the impact of PTC intervention on contraceptive behaviors and pregnancy outcomes. Finally, the results cannot be generalized to some youth populations living in group care homes such as pregnant and parenting teens, sexual offenders, and youth with significant mental, emotional or behavioral issues. These youths were excluded from the study because they have different needs and barriers to programming that the PTC intervention was not intended to address.

This is the first large-scale cluster randomized control study to assess the long-term effects of a TPP program on knowledge and psychosocial factors related to sexual behavior of youth living in out-of-home care. The results suggest that the PTC intervention has positive sustained effects on knowledge, attitudes, self-efficacy, and intentions related to HIV and STIs, sexual activity, and contraception methods. Additional research is needed to determine if these effects are associated with improvements in contraception use and a reduction in pregnancy.

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